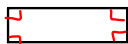


## 8-4 Rectangles

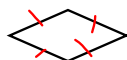
## 8-5 Rhombi and Squares

Rectangles, Rhombi, and Squares are all parallelograms

Rectangle--quadrilateral with 4 right angles



Rhombus--quadrilateral with 4 congruent sides

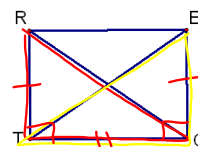


Square--quadrilateral with 4 right angles and 4 congruent sides



Given: Rectangle RECT

Prove:  $\overline{RC} \cong \overline{TE}$   $\triangle RCT$   $\triangle TEC$



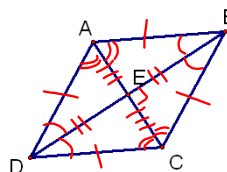
Statements	Reasons
① $\sim$	① Given
② $\overline{RT} \cong \overline{EC}$	② Opp sides of $\square$ are $\cong$
③ $\overline{TC} \cong \overline{TC}$	③ Refl.
④ $\angle RTC + \angle ECT$ are rt $\angle$ s	④ def. of Rect.
⑤ $\angle RTC \cong \angle ECT$	⑤ All rt $\angle$ s $\cong$
⑥ $\triangle RTC \cong \triangle ECT$	⑥ SAS
⑦ $\overline{RC} \cong \overline{TE}$	⑦ CPCTC

Theorem 8.13--Diagonals of a rectangle are congruent

Theorem 8.14--If the diagonals of a parallelogram are congruent, then it is a rectangle.



(4  $\cong$   $\triangle$ s)



Rhombus ABCD

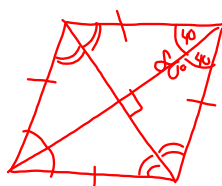
$$\triangle AEB \cong \triangle CED \cong \triangle CEB \cong \triangle AED$$

(SSS)

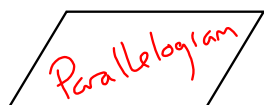
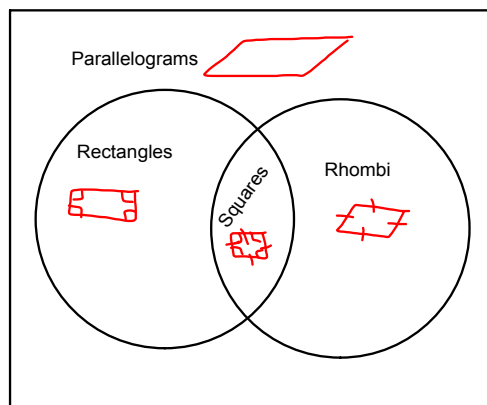
Theorem 8.15--The diagonals of a rhombus are perpendicular

Theorem 8.16--If the diagonals of a parallelogram are perpendicular, then it is a rhombus.

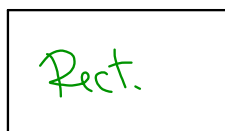
Theorem 8.17--Each diagonal of a rhombus bisects a pair of opposite angles



(4 Rt  $\triangle$ s)



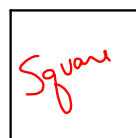
- opp sides  $\parallel$
- opp sides  $\cong$
- opp  $\angle$ s  $\cong$
- diagonals bis. each other
- cons  $\angle$ s are suppl.



- 5  $\square$  facts
- 4 Right  $\angle$ s
- diagonals are  $\perp$



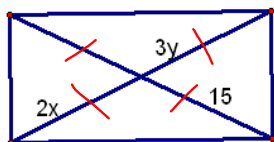
- 5  $\square$  facts
- 4  $\cong$  sides
- diagonals are  $\perp$
- diagonals bisect opp  $\angle$ s



- everything that is written

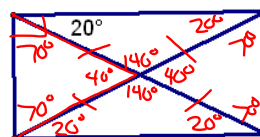
Examples:

Given the rectangle below, solve for x and y.



$$\begin{aligned} 2x &= 15 & 3y &= 15 \\ x &= 7.5 & y &= 5 \end{aligned}$$

Given the rectangle below, fill in all of the angles.



Is ABCD a rectangle?

A(-2, 1)

B(4, 3)

C(5, 0)

D(-1, -2)

(If you don't know it is a rectangle then check slopes of 4 sides)

$$\overline{AB} \text{ } m = \frac{1}{3} \quad \overline{BC} \text{ } m = -3$$

$$\overline{CD} \text{ } m = \frac{-2-0}{-1-5} = \frac{-2}{-6} = \frac{1}{3} \quad \overline{DA} \text{ } m = \frac{1-2}{-2-1} = \frac{-1}{-3} = \frac{1}{3}$$

yes opp sides // & consecutive sides are  $\perp$

Rhombus ABCD

$$m\angle ABC = 3m\angle BCD$$

Find

AB = 10

$m\angle ABC = 135^\circ$

$m\angle BCD = 45^\circ$

$m\angle BCE$

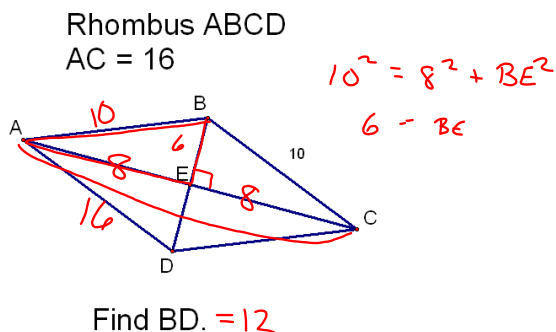
\*Find BE = 3.8

$$5 \ln 22.5 = \frac{y}{10}$$

$$x + 3x = 180$$

$$4x = 180$$

$$x = 45$$



Is  $\square ABCD$  a rectangle, rhombus, or a square. List all that apply.

1. A(-7, 3) B(-2, 3) C(1, 7) D(-4, 7)

$\overline{AC}$   $\overline{BD}$

$$m = \frac{7-3}{1-(-7)} = \frac{4}{8} = \frac{1}{2}$$

$$m = \frac{7-3}{-4-(-2)} = \frac{4}{-2} = -2$$

$\overline{AC} \perp \overline{BD}$

If you know it is a  $\square$   
check diagonals  
• If  $\cong$ , Rect.  
• If  $\perp$ , Rhombus  
• If both  $\cong$  &  $\perp$ , Square

$$AC = \sqrt{8^2 + 4^2} = \sqrt{64 + 16} = \sqrt{80}$$

$$BD = \sqrt{(-2)^2 + 4^2} = \sqrt{4 + 16} = \sqrt{20}$$

Rhombus b/c diagonals  $\perp$

Is  $\square ABCD$  a rectangle, rhombus, or a square. List all that apply. None

2. A(-2, -1) B(-4, 3) C(1, 5) D(3, 1)

$\overline{AC}$   $\overline{BD}$

$$m = \frac{5-(-1)}{1-(-2)} = \frac{6}{3} = 2$$

$$m = \frac{3-1}{-4-3} = \frac{2}{-7} = -\frac{2}{7}$$

not  $\perp$

$$AC = \sqrt{3^2 + 6^2} = \sqrt{45}$$

$$BD = \sqrt{(-7)^2 + 2^2} = \sqrt{53}$$

not  $\cong$